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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,148	09/22/2003	Shinya Yamasaki	Q77313	5798

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EXAMINER

LUND, JEFFRIE ROBERT

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 01/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/665,148

Applicant(s)

YAMASAKI ET AL.

Examiner

Jeffrie R. Lund

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-14 and 16-28 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,3-14 and 16-28 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 9/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: in the preliminary amendment filed September 22, 2003 claimed a priority date of "March 24, 2000". The priority date should read "March 14, 2000".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 4, 6, 14, 17, 19, 27, and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Doornveld, US Patent 4,668,334.

Doornveld teaches an etching apparatus that includes: a rotating means 2 for holding a semiconductor wafer 3 and for rotating said wafer in a horizontal plane, wherein said wafer comprises a device area and a surface peripheral area on a first surface, said surface peripheral area being located outside said device area; and an edge nozzle 9 for emitting an etching liquid 11 in a beam-shaped stream toward the surface peripheral area of said wafer, wherein said etching liquid emitted from said edge

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nozzle selectively etches out an unnecessary material existing in said surface peripheral area of said wafer, wherein said etching liquid emitted from said edge nozzle has an emission direction oriented outward with respect to a tangent of said wafer formed near a contact point of said liquid with said surface peripheral area of said wafer; a surface nozzle 4 for emitting a liquid toward a center of a first surface of the wafer. The specific material supplied by the surface nozzle or removed by the etching liquid is an intended use of the apparatus, and the apparatus of Doornveld can inherently supply any desired liquid (i.e. a protecting liquid) and remove the desired material from a wafer. (Entire document)

4. Claims 1, 6, 14, 19, 27, and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Moinpour et al, US Patent 5,861,066.

Moinpour et al teaches an etching apparatus that includes: a rotating means 330, 331 for holding a semiconductor wafer 310 and for rotating said wafer in a horizontal plane, wherein said wafer comprises a device area and a surface peripheral area on a first surface, said surface peripheral area being located outside said device area; and an edge nozzle (water jets) for emitting an etching liquid in a beam-shaped stream toward the surface peripheral area of said wafer, wherein said etching liquid emitted from said edge nozzle selectively etches out an unnecessary material existing in said surface peripheral area of said wafer, wherein said etching liquid emitted from said edge nozzle has an emission direction oriented along a rotation direction of said wafer and outward with respect to a tangent of said wafer formed near a contact point of said liquid with said surface peripheral area of said wafer. The specific material removed by the

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etching liquid is an intended use of the apparatus, and the apparatus of Moinpour et al can inherently supply any desired etching liquid to remove the desired material from a wafer. (Entire document)

5. Claims 1, 6, 11, 14, 17, 19, 24, 27, and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Sato, US Patent 5,993,547.

Sato teaches an etching apparatus that includes: a rotating means 3a-3c for holding a semiconductor wafer 1 and for rotating said wafer in a horizontal plane, wherein said wafer comprises a device area 2a and a surface peripheral area 2b on a first surface 2, said surface peripheral area being located outside said device area; and an edge nozzle 5 for emitting an etching liquid 6 in a beam-shaped stream toward the surface peripheral area of said wafer, wherein said etching liquid emitted from said edge nozzle selectively etches out an unnecessary material existing in said surface peripheral area of said wafer, wherein said etching liquid emitted from said edge nozzle has an emission direction oriented along a rotation direction of said wafer and outward with respect to a tangent of said wafer formed near a contact point of said liquid with said surface peripheral area of said wafer. The nozzle is angled to the first surface at an angle between 0 and 90° at a distance of 0 to 30 mm from the edge (column 5 lines 10-15). The specific material removed by the etching liquid is an intended use of the apparatus, and the apparatus of Sato can inherently supply any desired etching liquid to remove the desired material from a wafer. (Entire document)

6. Claims 1, 4, 6, 14, 17, 19, 27, and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Rolfson, US Patent 6,255,228 B1.

Rolfson teaches an etching apparatus that includes: a rotating means 14 for holding a semiconductor wafer 30 and for rotating said wafer in a horizontal plane, wherein said wafer comprises a device area and a surface peripheral area on a first surface, said surface peripheral area being located outside said device area; and an edge nozzle 9 for emitting an etching liquid 26 in a beam-shaped stream toward the surface peripheral area of said wafer, wherein said etching liquid emitted from said edge nozzle selectively etches out an unnecessary material existing in said surface peripheral area of said wafer, wherein said etching liquid emitted from said edge nozzle has an emission direction outward with respect to a tangent of said wafer formed near a contact point of said liquid with said surface peripheral area of said wafer; a surface nozzle 4 for emitting a liquid toward a center of a first surface of the wafer. The specific material supplied by the surface nozzle or removed by the etching liquid is an intended use of the apparatus, and the apparatus of Rolfson can inherently supply any desired liquid (i.e. a protecting liquid) and remove the desired material from a wafer. (Entire document)

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

7. Claims 1, 6, 14, 19, 27, and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Sellmer et al, US Patent 6,494,221 B1.

Sellmer et al teaches an etching apparatus that includes: a rotating means 12 for holding a semiconductor wafer 10 and for rotating said wafer in a horizontal plane,

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wherein said wafer comprises a device area and a surface peripheral area on a first surface, said surface peripheral area being located outside said device area; and an edge nozzle 18 for emitting an etching liquid 22 in a beam-shaped stream toward the surface peripheral area of said wafer, wherein said etching liquid emitted from said edge nozzle selectively etches out an unnecessary material existing in said surface peripheral area of said wafer, wherein said etching liquid emitted from said edge nozzle has an emission direction outward with respect to a tangent of said wafer formed near a contact point of said liquid with said surface peripheral area of said wafer. The specific material removed by the etching liquid is an intended use of the apparatus, and the apparatus of Sellmer et al can inherently remove the desired material from a wafer. (Entire document)

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

8. Claims 1, 4, 6, 14, 17, 19, 27, and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Stevens et al, US Patent 6,516,815 B1.

Stevens et al teaches an etching apparatus that includes: a rotating means 104 for holding a semiconductor wafer 122 and for rotating said wafer in a horizontal plane, wherein said wafer comprises a device area and a surface peripheral area on a first surface, said surface peripheral area being located outside said device area; and an edge nozzle 150 for emitting an etching liquid in a beam-shaped stream toward the surface peripheral area of said wafer, wherein said etching liquid emitted from said edge

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nozzle selectively etches out an unnecessary material existing in said surface peripheral area of said wafer, wherein said etching liquid emitted from said edge nozzle has an emission direction oriented along a rotation direction of said wafer and outward with respect to a tangent of said wafer formed near a contact point of said liquid with said surface peripheral area of said wafer; a surface nozzle 172 for emitting a protective liquid toward a center of a first surface of the wafer. The specific material removed by the etching liquid is an intended use of the apparatus, and the apparatus of Stevens et al can inherently remove the desired material from a wafer. (Entire document)

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 3, 5, 8, 11-13, 16, 18, 21, and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rolfson, US Patent 6,255,228 B1 in view of Miyashita, JP-63-193529.

Rolfson was discussed above.

Rolfson differs from the present invention in that Rolfson does not teach a nozzle emitting a liquid toward the center of the back surface of the wafer, a pin support

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means, the distance from the edge at which the longitudinal axis of the nozzle intersects the first surface, and the distance and angle of the nozzles from the surfaces (first side and back surface) of the wafer.

Miyashita teaches a processing chamber that includes: an upper nozzle 19b for emitting a liquid onto the center of the first side of a wafer at an angle between 15 and 60°; a second nozzle 19a for emitting a liquid onto the center of the back surface of the wafer at an angle between 15 and 60°; and a pin support 12.

Optimizing the distance of the nozzles from the edge or surface of the substrate is obvious and well within the skill of one of ordinary skill in the art.

The motivation for replacing the bottom nozzle of Rolfson with the bottom nozzle of Miyashita is to clean the entire back surface of the wafer as taught by Miyashita. The motivation for replacing the holding means of Rolfson with the pin holder of Miyashita is to provide an alternate and equivalent means of holding the wafer, and to enable the entire back surface of the wafer to be cleaned as taught by Miyashita. The motivation for optimizing the distance of the nozzles from the edge or surface of the wafer is to optimize the delivery of the etching liquid to the edge or surface of the wafer.

Furthermore, it was held in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), by the Federal Circuit that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed

device was not patentably distinct from the prior art device. (Also see MPEP 2144.04 (d))

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace a back surface nozzle and holding means of Rolfson with the nozzle and holding means of Miyashita and to optimize the distance of the nozzles from the edge or surface of the wafer.

11. Claims 7 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rolfson, US Patent 6,255,228 B1 in view of Miyashita et al, US Patent 6,167,583 B1.

Rolfson was discussed above.

Rolfson differs from the present invention in that Rolfson does not teach a holding means comprising rollers arranged along an end face of the wafer to hold and rotate the wafer.

Miyashita et al teaches a holding means that includes rollers 11 arranged along an end face of the wafer 1 to hold and rotate the wafer. (Figure 3a-3c)

The motivation for replacing the holding means of Rolfson with the holding means of Miyashita et al is to provide an alternate and equivalent means of holding the wafer.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the holding means of Rolfson with the holding means of Miyashita et al.

12. Claims 7 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rolfson, US Patent 6,255,228 B1 in view of Miyashita et al, US Patent 6,167,583 B1.

Rolfson was discussed above.

Rolfson differs from the present invention in that Rolfson does not teach a holding means comprising rollers arranged along an end face of the wafer to hold and rotate the wafer.

Miyashita et al teaches a holding means that includes rollers 11 arranged along an end face of the wafer 1 to hold and rotate the wafer. (Figure 3a-3c)

The motivation for replacing the holding means of Rolfson with the holding means of Miyashita et al is to provide an alternate and equivalent means of holding the wafer.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the holding means of Rolfson with the holding means of Miyashita et al.

Response to Arguments

13. Applicant's arguments with respect to claims 1, 3-8, 12-14, 16-21, and 24-28 have been considered but are moot in view of the new ground(s) of rejection.

14. Applicant's arguments, see paragraphs directed to claims 9, 10, 22, and 23, filed October 29, 2004, with respect to claims 9, 10, 22, and 23 have been fully considered and are persuasive. The rejections of claims 9, 10, 22, and 23 have been withdrawn.

15. Applicant's arguments filed October 29, 2004, specifically, those arguments directed to claims 1, 4, 6, 14, 17, and 19 have been fully considered but they are not persuasive.

In regard to the argument that the nozzle 21a of Rolfson is not "oriented along a rotation direction of said wafer", the Examiner agrees. However the claim reads:

"an emission direction oriented along a rotation direction of said wafer or outward with respect to a tangent of said wafer formed near a contact point of said liquid with said surface peripheral area of said wafer" (emphasis added)

Therefore, because the claim includes an alternative limitation (i.e. "an emission direction oriented along a rotation direction of said wafer" or "outward with respect to a tangent of said wafer formed near a contact point of said liquid with said surface peripheral area of said wafer") Rolfson is not required to teach that the nozzle 21a is "oriented along a rotation direction of said wafer". Rolfson clearly teaches that the emission direction is oriented outward with respect to a tangent of said wafer formed near a contact point of said liquid with said surface peripheral area of said wafer. In fact, the nozzle of Rolfson reads on the angle limitation of claims 11 and 24.

In regard to the argument that "Rolfson is related to a method of manufacturing a semiconductor wafer utilizing a spin coating device, not an etching or cleaning apparatus similar to that of the instant Application" the Examiner disagrees. It is true that Rolfson is directed to a spin coating device, it is also true that Rolfson is also directed to an etching or cleaning device. Rolfson teaches nozzles 21a and 21b are used to remove unwanted material from the peripheral edge of the wafer. Furthermore, it has been held that: claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danley*, 120 USPQ 528, 531, (CCPQ 1959); "Apparatus claims cover what a device is, not what a device does" (Emphasis in

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original) *Hewlett-Packard Co. V. Bausch & Lomb Inc.*, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990); and a claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus “ if the prior art apparatus teaches all the structural limitations of the claim *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Also see MPEP 2114. The apparatus of Rolfson teaches all the claimed structural elements.

In regard to the argument that Rolfson does not teach a “surface nozzle for emitting a protecting liquid toward a center of the first surface of said wafer”, the Examiner disagrees. Rolfson teaches a nozzle 16 located over the center of the wafer that emits a liquid toward the center of the wafer. The specific liquid supplied by the nozzle of Rolfson is an intended use of the apparatus of Rolfson, and the apparatus of Rolfson can inherently supply any desired liquid. As noted above claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danley*, 120 USPQ 528, 531, (CCPQ 1959); “Apparatus claims cover what a device is, not what a device does” (Emphasis in original) *Hewlett-Packard Co. V. Bausch & Lomb Inc.*, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990); and a claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus “ if the prior art apparatus teaches all the structural limitations of the claim *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Also see MPEP 2114.

In regard to the argument that Rolfson does not teach that the “etching liquid emitted from said edge nozzle is beam-shaped”, the Examiner disagrees. The term “beam-shaped” is a broad term and describes the shape of the etching liquid discharged from the nozzles 21a-21b.

Allowable Subject Matter

16. Claims 9, 10, 22, and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. The following is a statement of reasons for the indication of allowable subject matter: the first and second group of pins arranged alternately around the substrate and alternatively contact the wafer, as claimed in claims 9, 10, 22, and 23, was not taught in or suggested by the art.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited art teaches the technological background of the invention.

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

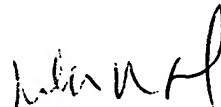
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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (571) 272-1437. The examiner can normally be reached on Monday-Thursday (6:30 am-6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571) 272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jeffrie R. Lund
Primary Examiner
Art Unit 1763

JRL
1/17/05